# Course reader: *Calculator and colon operator*

- MATLAB is like a fancy calculator. That means you can also use it like a simple calculator. This is a good way to gain initial familiarity with using MATLAB.

- You can type equations into the Command Window and press Enter to see the result. For example, type `1+3*4`

- The math using symbols are what you might expect them to be (+,−,*,/). A power ($3^2$) is indicated with the carot symbol: `3^2`).

- Spacing is useful to make lines of code easier to read. Consider the following two lines:

  ```
  5+6^2*4/5+2
  5 + 6^2 * 4/5 + 2
  ```

  Both lines produce the same result; the second one is easier for a human to read (and debug!).

- You can also use parentheses to improve code readability:

  ```
  5+6^2*4/5+2
  5+(6^2)*(4/5)+2
  ```

- Parentheses can also be used to override order-of-operations. Type these two equations into MATLAB to see:

  `3^1+1` (same as `(3^1) + 1`)
  `3^(1+1)` (same as `3^2`)

- The colon operator is used to count from one number to another, skipping by some amount (default skip is 1). Examples:

  `0:3` → 0 1 2 3
  `0:.2:.9` → 0 .2 .4 .6 .8
  `1:-1:-3` → 1 0 -1 -2 -3

# Exercises

**1.** Compute the following equations (use parentheses to group terms!):

**a)** $4 + 5 \times \frac{2}{16+3}$ **b)** $14^{23} \times 95^{-4} - \frac{14^{95}}{15^{94}}$ **c)** $(40+70-3\times\frac{40}{70})\frac{40}{70}$ **d)** $\frac{-4+2^3-.48}{3^{2.2}\times 17.3}$

**2.** Use the colon operator to obtain the following number sequences.

**a)** 1 2 3 4
**b)** -4 -3.5 -3 -2.5 -2
**c)** 10 20 30 40 50 60 70
**d)** -4 15 34 53
**e)** 100 91 82 73 64 55 46
**f)** 0 5 10 15 20

**3.** Do the following line-pairs of MATLAB code produce different results? First think of your answer and then confirm by testing in MATLAB.

**a)**
```
1:2:6
0:2:6
```
**b)**
```
1:15:30
1:15:36
```
**c)**
```
10:15:30
10:15:31
```

# Answers

**1.** This is the MATLAB code, not the numerical answers.

**a)** `4+5*(2/(16+3))`

**b)** `14^23 * 95^-4 - (14^95)/(15^94)`

**c)** `( 40+70-3*(40/70) )*(40/70)`

**d)** `(-4+2^3-.48)/(3^2.2 * 17.3)`

**2.**

**a)** `1:4`

**b)** `-4:.5:2`

**c)** `10:10:70`

**d)** `-4:19:53`

**e)** `100:-9:46`

**f)** `0:5:20`

**3.**

**a)** Different

**b)** Different

**c)** Same